ANNEX 1 Key Source Analysis

The U.S. provides an analysis of key sources of emissions found in this report in order to ensure accuracy and reliability of inventory estimates. The IPCC's *Good Practice Guidance* (IPCC 2000) defines a key source category as a "[source category] that is prioritized within the national inventory system because its estimate has a significant influence on a country's total inventory of direct greenhouse gases in terms of the absolute level of emissions, the trend in emissions, or both."[1] By definition, key source categories are sources that have the greatest contribution to the absolute overall level of national emissions. In addition, when an entire time series of emission estimates is prepared, a thorough investigation of key source categories must also account for the influence of trends of individual source categories. Therefore, a trend assessment is conducted to identify source categories for which significant uncertainty in the estimate would have considerable effects on overall emission trends. This analysis culls out source categories that diverge from the overall trend in national emissions. Finally, a qualitative evaluation of key source categories should be performed, in order to capture any key source categories that were not identified in either of the quantitative analyses.

The methodology for conducting a key source analysis, as defined by IPCC's *Good Practice Guidance* (IPCC 2000), includes:

- Tier 1 approach (including both level and trend assessments);
- Tier 2 approach (including both level and trend assessments, and incorporating uncertainty analysis); and
- Qualitative approach.

This Annex presents an analysis of key source categories; discusses Tier 1, Tier 2, and qualitative approaches to identifying key sources; provides level and trend assessment equations; and provides a brief statistical evaluation of IPCC's quantitative methodologies for defining key sources.

Table 1-1 presents the key source categories for the United States using emissions data in this report, and ranked according to their sector and global warming potential-weighted emissions in 2002. The table also identifies the criteria used in identifying these source categories (i.e., level, trend, and/or qualitative assessments).

Table 1-1: Key Source Categories for the United States (1990-2002) Based on Tier 1 Approach

IPCC Source Categories	Gas	Level	Trend	Qual[a]	2002 Emissions (Tg CO_2 Eq.)
Energy					
CO_2 Emissions from Stationary Combustion – Coal	CO_2	✓	✓		2,005.6
Mobile Combustion: Road & Other	CO_2	✓	✓		1,534.4
CO_2 Emissions from Stationary Combustion – Gas	CO_2	✓	✓		1,160.6
CO_2 Emissions from Stationary Combustion – Oil	CO_2	✓	✓		680.1
Mobile Combustion: Aviation	CO_2	✓	✓		177.6
Fugitive Emissions from Natural Gas Operations	CH_4	✓	✓		121.8
Fugitive Emissions from Coal Mining & Handling	CH_4	✓	✓		52.2
Mobile Combustion: Marine	CO_2	✓			52.4
Mobile Combustion: Road & Other	N_2O	✓			50.7
Fugitive Emissions from Oil Operations	CH_4		✓		23.2
International Bunker Fuels[b]	Several			✓	87.7
Non-Energy Use of Fossil Fuel[b]	CO_2			✓	260.6
Industrial Processes					
Emissions from Substitutes for Ozone Depleting Substances	Several	✓	✓		91.7
CO_2 Emissions from Iron and Steel Production	CO_2	✓	✓		54.4
CO_2 Emissions from Cement Production	CO_2	✓	✓		42.9
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	✓	✓		19.8
SF_6 Emissions from Electrical Equipment	SF_6		✓		14.8
N_2O Emissions from Adipic Acid Production	N_2O		✓		5.9

[1] See chapter 7 "Methodological Choice and Recalculation" in IPCC (2000).
< http://www.ipcc-nggip.iges.or.jp/public/gp/gpgaum.htm>

PFC Emissions from Aluminum Production	PFCs		✓	5.2
Agriculture				
Direct N_2O Emissions from Agricultural Soils	N_2O	✓	✓	209.9
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	✓	✓	114.4
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	✓	✓	77.4
CH_4 Emissions from Manure Management	CH_4	✓		39.5
Waste				
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	✓	✓	193.0
CH_4 Emissions from Wastewater Handling	CH_4	✓		28.7
CO_2 Emissions from Waste Incineration	CO_2		✓	18.8
Subtotal				6,775.0
Total Emissions				6,934.6
Percent of Total				97.7%

[a]Qualitative criteria.

[b]Emissions from these sources not included in totals.

Notes: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis. The Tier 1 approach for identifying key source categories does not directly include assessment of uncertainty in emissions estimates.

Table 1-2 provides a complete listing of source categories by IPCC sector and with additional comments on the criteria used in identifying key source categories. Specifically, the level assessment was performed for each year that inventory data was available (i.e., 1990 to 2002). As the emissions change over time, categories may fall under or over the threshold for being a key source. The following points should be noted regarding the key sources identified.

Due to the relative quantity of CO_2 emissions from fossil fuel combustion—particularly from mobile combustion in road vehicles and stationary combustion of coal, gas, and oil—these sources contributed most to each year's level assessment. Additionally, the following sources were the largest contributors to the level assessments for each year (listed in descending order as appear in recent years):

- Direct N_2O from agricultural soils;
- CH_4 from solid waste disposal sites;
- CO_2 emissions from mobile combustion in the aviation sector;
- Fugitive emissions from natural gas operations;
- CH_4 from enteric fermentation in domestic livestock;
- Indirect N_2O emissions from nitrogen used in agriculture;
- CO_2 emissions from iron and steel production;
- Fugitive emissions from coal mining;
- N_2O emissions from mobile combustion in road vehicles; and
- CO_2 emissions from cement production.

The remaining key sources identified under the level assessment varied by year. The following five source categories were determined to be key using the level assessment for only part of the complete time series:

- HFC and PFC emissions from substitutes for ozone depleting substances (1996-2002);
- CO_2 emissions from mobile combustion in the marine sector (1990-1997, 1999-2000, 2002);
- HFC-23 emissions from HCFC-22 manufacture (1990-1996, 1998);
- CH_4 Emissions from manure management (1990-1999, 2001); and
- CH_4 Emissions from wastewater handling (1995).

Although other sources have fluctuated by greater percentages since 1990, by virtue of their size, CO_2 emissions from mobile combustion from road vehicles and stationary combustion of coal, and oil are the greatest contributors to the overall trend for 2002. The fourth largest contributor to the overall trend in 2002—jumping

ahead of CO_2 emissions from stationary combustion of gas—is emissions from substitutes for ozone depleting substances (ODSs). These emissions have grown quickly with the Montreal Protocol phase-out of ODSs.

Fugitive emissions from coal mining and PFC emissions from aluminum manufacturing have decreased by approximately 36 and 71 percent, respectively, from 1990 through 2002. Reductions in emissions from coal mining are primarily due to EPA's voluntary coalbed methane capture program and the mining of less gassy coal than in previous years. PFC emissions have decreased primarily as a result of emission reduction activities by the aluminum industry.

The remaining source categories that were identified as key sources based solely on a trend assessment are listed below.

- Fugitive emissions from oil operations;
- SF_6 emissions from electrical equipment;
- N_2O emissions from adipic acid production;
- PFC emissions from aluminum production; and
- CO_2 emissions from waste incineration.

In addition to conducting Tier 1 level and trend assessments, a qualitative assessment of the source categories, as described in the IPCC's *Good Practice Guidance* (IPCC 2000), was conducted to capture any key sources that were not identified by either quantitative method. Two additional key sources were identified using this qualitative assessment. A brief discussion of the reasoning for the qualitative designation is given below:

- International bunker fuels are fuels consumed for aviation or marine international transport activities, and emissions from these fuels are reported separately from totals in accordance with IPCC guidelines. If these emissions were included in the totals, bunker fuels would qualify as a key source according to the Tier 1 approach. The amount of uncertainty associated with estimation of emissions from international bunker fuels also supports the qualification of this source category as key.
- Non-energy uses of fossil fuels represent a significant percentage of the total carbon inventory, and the idea that small changes in storage factors for these non-energy uses may result in large changes in storage and emissions qualifies this source category as key.

Following the text of this Annex, Table 1-3 through Table 1-15 contain each individual year's level assessment and contain further detail on where each source falls within the analysis. Table 1-16 details the trend assessment for 1990 through 2002.

Table 1-2: U.S Greenhouse Gas Inventory Source Categories Based on Tier 1 Approach

IPCC Source Categories	Direct GHG	2002 Emissions (Tg CO_2 Eq.)	Key Source Category Flag?	ID Criteria	Comments
Energy					
CO_2 Emissions from Stationary Combustion - Coal	CO_2	2,005.6	✓	L, T	All years
CO_2 Emissions from Stationary Combustion - Oil	CO_2	680.1	✓	L, T	All years
CO_2 Emissions from Stationary Combustion - Gas	CO_2	1,160.6	✓	L, T	All years
CO_2 Emissions from Stationary Combustion – Geothermal	CO_2	0.3			
CO_2 Emissions from Natural Gas Flaring	CO_2	5.3			
Non-CO_2 Emissions from Stationary Combustion	CH_4	6.9			
Non-CO_2 Emissions from Stationary Combustion	N_2O	14.0			
Mobile Combustion: Road & Other	CO_2	1,534.4	✓	L, T	All years
Mobile Combustion: Road & Other	CH_4	4.0			
Mobile Combustion: Road & Other	N_2O	50.7	✓	L	All years
Mobile Combustion: Aviation	CO_2	177.6	✓	L, T	All years
Mobile Combustion: Aviation	CH_4	0.1			
Mobile Combustion: Aviation	N_2O	1.7			
Mobile Combustion: Marine	CO_2	52.4	✓	L	Level in 1990 - 1997, 1999 - 2000, 2002
Mobile Combustion: Marine	CH_4	0.1			
Mobile Combustion: Marine	N_2O	0.4			

Fugitive Emissions from Coal Mining & Handling	CH_4	52.2	✓	L, T	All years
Fugitive Emissions from Abandoned Coal Mines	CH_4	4.1			
Fugitive Emissions from Natural Gas Operations	CH_4	121.8	✓	L, T	All years
Fugitive Emissions from Oil Operations	CH_4	23.2	✓	T	
International Bunker Fuels[a]	Several	87.7	✓	Q	
Non-Energy Use of Fossil Fuel[a]	CO_2	260.6	✓	Q	
Industrial Processes					
CO_2 Emissions from Cement Production	CO_2	42.9	✓	L, T	All years
CO_2 Emissions from Iron and Steel Production	CO_2	54.4	✓	L, T	All years
CO_2 Emissions from Lime Production	CO_2	12.3			
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.8			
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	17.7			
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.3			
CO_2 Emissions from Titanium Dioxide Production	CO_2	2.0			
CO_2 Emissions from Ferroalloys	CO_2	1.2			
CO_2 Emissions from CO_2 Consumption	CO_2	1.3			
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1			
CO_2 Emissions from Aluminum Production	CO_2	4.2			
CH_4 Emissions from Iron and Steel Production	CH_4	1.0			
CH_4 Emissions from Silicon Carbide Production	CH_4	+			
CH_4 Emissions from Petrochemical Production	CH_4	1.5			
N_2O Emissions from Adipic Acid Production	N_2O	5.9	✓	T	
N_2O Emissions from Nitric Acid Production	N_2O	16.7			
N_2O Emissions from N_2O Product Usage	N_2O	4.8			
PFC Emissions from Aluminum Production	PFCs	5.2	✓	T	
SF_6 Emissions from Magnesium Production	SF_6	2.4			
SF_6 Emissions from Electrical Equipment	SF_6	14.8	✓	T	
HFC, PFC, and SF_6 Emissions from Semiconductor Manufacturing	Several	4.4			
Emissions from Substitutes for Ozone Depleting Substances	Several	91.7	✓	L, T	Level from 1996 - 2002
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	19.8	✓	L, T	Level in 1990 - 1996, 1998
Agriculture					
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	114.4	✓	L, T	All years
CH_4 Emissions from Manure Management	CH_4	39.5	✓	L	Level in 1990 – 1999, 2001
N_2O Emissions from Manure Management	N_2O	17.8			
Direct N_2O Emissions from Agricultural Soils	N_2O	209.9	✓	L, T	All years
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	77.4	✓	L, T	All years
CH_4 Emissions from Rice Production	CH_4	6.8			
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7			
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4			
Waste					
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	193.0	✓	L, T	All years
CH_4 Emissions from Wastewater Handling	CH_4	28.7	✓	L	Level in 1995
N_2O Emissions from Wastewater Handling	N_2O	15.6			
CO_2 Emissions from Waste Incineration	CO_2	18.8	✓	T	
N_2O Emissions from Waste Incineration	N_2O	0.4			

[a] Emissions from these sources not included in totals.

+ Does not exceed 0.05 Tg CO_2 Eq.

Notes: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis. The Tier 1 approach for identifying key source categories does not directly include assessment of uncertainty in emissions estimates.

Tier 1 Approach

The Tier 1 method for identifying key source categories assesses the impacts of all IPCC-defined source categories on the level and trend of the national emission inventory for the 1990 through 2002 time-series, but works independently of any formal uncertainty analysis. Although conducting a Tier 1 key source analysis is very valuable in improving the U.S. inventory, it would be ideal to incorporate the results of an uncertainty analysis into the key source analysis in order to be able to take into account the level of uncertainty associated with each estimate.

Although quantitative uncertainty analyses have been conducted for almost every U.S. emission source, an assessment of the uncertainty of all source categories required before uncertainties can be taken into account for the key source analysis. See the description of the Tier 2 approach for further explanation.

When using a Tier 1 approach for the *level*, a predetermined cumulative emissions threshold is used to identify key source categories. When source categories are sorted in order of decreasing emissions, those that fall at the top of the list and cumulatively account for 95 percent of emissions are considered key source categories. The 95 percent threshold was established based on an evaluation of several inventories, and was designed to establish a general level where the key source category analysis covers approximately 75 to 92 percent of inventory uncertainty. The Tier 1 approach for the *trend* uses a 95 percent contribution threshold of the cumulative contribution to the trend assessment metric, which was also designed to establish a general level where the key source category analysis covers 90 percent of inventory uncertainty. The Tier 1 method is completed using a simple spreadsheet analysis based on equations for both level and trend assessments that are described in detail below. It is the current approach that the United States is taking to identify key source categories of greenhouse gas emissions until a rigorous uncertainty analysis is completed.

Tier 2 Approach

IPCC recommends that inventory agencies use the Tier 2 method for identifying key source categories if nationally derived source-level uncertainties are measured. The Tier 2 approach is a more detailed analysis that builds on the Tier 1 approach by multiplying the results of the Tier 1 analysis by the relative uncertainty of each source category. This method is likely to reduce the number of key source categories under consideration. Using the Tier 2 approach, key source categories represent 90 percent of the uncertainty in the national inventory, as opposed to those that sum to the pre-determined cumulative emissions or trend threshold. A simple spreadsheet version accounts for the uncertainty contribution by applying the source category percentage uncertainty estimates to the Tier 1 level and trend assessments.

The U.S. EPA is in the process of developing a robust plan to support data gathering for both a Tier 1 and/or a Monte Carlo level analysis. Where a Monte Carlo approach to uncertainty analysis has been undertaken, uncertainty estimates for each source category have been developed based on (a) source category-specific input variables, such as activity data and emission factors, (b) the statistical properties underlying the input variables (i.e., the characteristics of the probability distributions of the input variables, such as mean and standard deviation in the case of a normal distribution), and (c) the mathematical relationship between the input variables used to estimate the emissions for each source category (e.g., emissions = activity data * emission factor). As part of a multi-year effort, the United States has already developed quantitative uncertainty estimates for most source categories. However, because quantitative estimates of uncertainty are not yet available for all source categories, it is premature to conduct a Tier 2 key source analysis at this point. Future inventories will incorporate this Tier 2 approach.

Qualitative Approach

In addition to conducting a quantitative assessment like the ones described above, a variety of qualitative criteria could be applied to identify additional key source categories. The following qualitative criteria for identifying key source categories have been outlined in the *Good Practice Guidance* (IPCC 2000). A source category should be identified as a key source if:

- Mitigation techniques and technologies are being implemented to reduce emissions from the source category that are expected to be reflected in the inventory estimates;
- Significant changes in emissions (i.e., growth or decline) from the source category is expected in the future;
- High uncertainty is evident for the source category; or
- Unexpectedly low or high emissions, or other order of magnitude discrepancies, are apparent for the source category.

In many cases, the results of this qualitative approach to identifying key source categories will overlap with source categories already defined as key source categories through the quantitative analysis. However, the qualitative method may illuminate a few additional key source categories, which should then be included in the final list of key source categories. However, the application of such qualitative criteria are primarily intended to identify any additional source categories that were "just under" the threshold criteria for the level assessment and not for

extremely minor source categories. Among those that are considered key from a qualitative standpoint are emissions from international bunker fuels and non-fuel use of fossil fuels. International bunker fuel emissions are not included in national totals, and are not considered in the level or trend analyses mentioned above, but are considered key from a qualitative standpoint due to their unique position within the emissions accounting framework. Additionally, non-fuel use of fossil fuels is also not included in the level or trend analyses. However, due to the significant quantity of fossil fuels consumed in the United States that are not used to produce energy (generically referred to as feedstocks), it is imperative to understand their fate and to determine how much of the consumption results in emissions, versus in stored carbon.

Level and Trend Assessments of Key Source Categories

Level Assessment

A level assessment was performed for years 1990 to 2002. Key sources were identified as any source category which, when summed in descending order of magnitude for a given year, cumulatively add up to 95 percent of the total level assessment for that year. Level estimates are based upon the following equation:

$$\text{Source Category Level Assessment} = \text{Source Category} / \text{Total Estimate}$$
$$L_{x,t} = E_{x,t} / E_t$$

Where:

$L_{x,t}$ = level assessment for source x in year t
$E_{x,t}$ = emissions estimate for source x in year t
E_t = total emissions estimate for year t

Trend Assessment

A trend assessment was then conducted to evaluate how significantly the difference between the source category's trend and the overall inventory trend affect the overall trend. This assessment was done by multiplying the difference between the source category trend and the total inventory trend by the source category level assessment. Trend assessments were based upon the following equation:

$$\text{Source Category Trend Assessment} = (\text{Source Category Level Assessment}) \times \left| (\text{Source Category Trend} - \text{Total Trend}) \right|$$
$$T_{x,t} = L_{x,t} \times \left| [((E_{x,t} - E_{x,o}) / E_{x,t}) - ((E_t - E_o) / E_t)] \right|$$

Where:

$T_{x,t}$ = trend assessment for source x in year t
$L_{x,t}$ = level assessment for source x in year t
$E_{x,t}$ and $E_{x,0}$ = emissions estimates for source x in year t and year 0, respectively
E_t and E_0 = total emissions estimate for year t and year 0, respectively
0 = base year (e.g., 1990)

The following section of this annex evaluates these key source category analyses. The remainder of the annex summarizes the key source categories identified by these analyses, and quantifies their contribution to total level and trend assessments.

Evaluation of Key Source Identification Methodologies

Level Assessment

The Tier 1 approach for level assessment defines the source category contribution as the percentage of total inventory emissions from that source category. Only emission source categories are considered.[2] To determine key source categories, the level assessments are sorted in decreasing order, so that the source categories with the highest level assessments appear first. The level assessments are summed until the threshold of 95 percent is reached; all source categories that fall within that cumulative 95 percent are considered key source categories.

Since the Tier 1 approach does not explicitly incorporate uncertainties, the level assessment key source categories will be the largest contributors to total emissions but will not necessarily have large contributions to the total uncertainty. Focusing resources on improving the methodologies for estimating emissions from the source categories with the largest emissions is undesirable if those emissions are estimated relatively precisely using the current methodologies. Nevertheless, the analysis (reported in IPCC 2000) of several inventories that have source category uncertainties showed that about 75 to 92 percent of the total uncertainty could be covered by the source categories in the top 95 percent of emissions.

It is important to note that this key source category analysis can be very sensitive to the definitions of the source categories. If a large source category is split into many subcategories, then the subcategories may have contributions to the total inventory that are too small for those source categories to be considered key. Similarly, a collection of small, non-key source categories adding up to less than 5 percent of total emissions could become key source categories if those source categories were aggregated into a single source category. A consistent approach to addressing this issue is available in the *Good Practice Guidance*. Table 7.1 in IPCC (2000) provides guidance and a suggested list of source categories for analysis, although countries are given some discretion based upon their national circumstances.

Some important components of other source categories were not included in the list of IPCC source categories in the key source category chapter of IPCC's *Good Practice Guidance* (IPCC 2000). These source categories include fossil fuel feedstocks, international bunkers, and emissions from U.S. territories. They are potentially large source categories that often are derived from unique data sources using country-specific methodologies, and may have a significant impact on the uncertainty of the estimates.

Trend Assessment

The Tier 1 approach for trend assessment is defined as the product of the source category level assessment (i.e., source category emissions as a fraction, or percentage, of total emissions) and the absolute difference between the source category trend and the total trend. In turn, the source category trend is defined as the change in source category emissions from the base year to the current year, as a percentage of current year emissions from that source category. The total trend is the percentage change in total inventory emissions from the base year to the current year. Thus, the *source category trend assessment* will be large if the source category represents a large percentage of emissions and/or has a trend that is quite different from the overall inventory trend. Only emissions source categories are considered.[3] To determine key source categories, the trend assessments are sorted in decreasing order, so that the source categories with the highest trend assessments appear first. The trend assessments are summed until the threshold of 95 percent is reached; all source categories that fall within that cumulative 95 percent are considered key source categories.

It is important to note that the trend assessment calculation assumes that the base and current year source category emission uncertainties are the same. Therefore, the trend assessment is a useful measure in cases where the percentage uncertainties of the base and current year source category emission levels are thought to be the same. However, its usefulness diminishes when individual source category uncertainties are different between the base year and the current year. Such time series inconsistencies could result from changes in data quality or availability

[2] The level assessment is intended to be applied to sources and to exclude sinks. Although the assessment would still be valid if sinks were included (as unsigned values), the 95 percent threshold by which sources are deemed "key" would lose significance because it is based on an analysis (Flusgrud et al. 1999) of selected inventories where sinks were excluded.

[3] The trend assessment is intended to be applied to sources and to exclude sinks. Although the assessment would still be valid if sinks were included (as unsigned values), the 95 percent threshold by which sources are deemed "key" would lose significance because it is based on an analysis (Flusgrud et al. 1999) of selected inventories where sinks were excluded.

over time. As more rigorous methods to determine uncertainties in emission estimates are applied, it may be necessary to revisit the results of the trend assessments.

Another important caveat to the identification of key source categories through the trend assessment is that, while each individual source category's trend assessment provides a measure of how sensitive the overall trend in the inventory is to the trend of a particular source category, the sum of a number of trend assessments does not yield the total sensitivity of the overall trend to changes in all of those source categories. In other words, the cumulative percentages should not be considered a measure of the percentage contributions to the trend from those source categories.

The trend assessment key source categories are also sensitive to the level of aggregation of the source categories; and the IPCC list of source categories may exclude some important, potentially key source category components.

Table 1-3: 1990 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate (Tg CO_2 Eq.)	Current Year Estimate (Tg CO_2 Eq.)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	1,681.4	0.27	0.27
Mobile Combustion: Road & Other	CO_2	1,233.4	1,233.4	0.20	0.48
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	978.9	0.16	0.64
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	695.7	0.11	0.75
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	210.0	0.03	0.78
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	190.5	0.03	0.81
Mobile Combustion: Aviation	CO_2	176.9	176.9	0.03	0.84
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	122.0	0.02	0.86
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	117.9	0.02	0.88
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	85.4	0.01	0.90
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	81.9	0.01	0.91
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	72.3	0.01	0.92
Mobile Combustion: Road & Other	N_2O	48.5	48.5	0.01	0.93
Mobile Combustion: Marine	CO_2	48.0	48.0	0.01	0.94
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	35.0	0.01	0.94
CO_2 Emissions from Cement Production	CO_2	33.3	33.3	0.01	0.95
CH_4 Emissions from Manure Management	CH_4	31.0	31.0	0.01	0.95
SF_6 Emissions from Electrical Equipment	SF_6	29.2	29.2	<0.01	0.96
Fugitive Emissions from Oil Operations	CH_4	28.9	28.9	<0.01	0.96
CH_4 Emissions from Wastewater Handling	CH_4	24.1	24.1	<0.01	0.97
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	19.3	<0.01	0.97
PFC Emissions from Aluminum Production	PFCs	18.1	18.1	<0.01	0.97
N_2O Emissions from Nitric Acid Production	N_2O	17.8	17.8	<0.01	0.98
N_2O Emissions from Manure Management	N_2O	16.2	16.2	<0.01	0.98
N_2O Emissions from Adipic Acid Production	N_2O	15.2	15.2	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	12.8	<0.01	0.98
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	12.6	<0.01	0.98
CO_2 Emissions from Lime Production	CO_2	11.2	11.2	<0.01	0.99
CO_2 Emissions from Waste Incineration	CO_2	10.9	10.9	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	8.2	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	7.1	<0.01	0.99
CO_2 Emissions from Aluminum Production	CO_2	6.3	6.3	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	5.8	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	5.5	<0.01	0.99
SF_6 Emissions from Magnesium Production	SF_6	5.4	5.4	<0.01	0.99
Mobile Combustion: Road & Other	CH_4	4.7	4.7	<0.01	1.00
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.3	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.1	<0.01	1.00
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	3.4	<0.01	1.00
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	2.9	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	2.0	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.7	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.5	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.3	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	1.3	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.2	<0.01	1.00
CO_2 Emissions from CO2 Consumption	CO_2	0.9	0.9	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.7	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.4	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.4	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.4	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.4	<0.01	1.00
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	0.3	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.2	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	6,129.1	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-4: 1991 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate (Tg CO_2 Eq.)	Current Year Estimate (Tg CO_2 Eq.)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	1,679.1	0.28	0.28
Mobile Combustion: Road & Other	CO_2	1,233.4	1,216.7	0.20	0.48
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,004.0	0.16	0.64
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	669.0	0.11	0.75
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	209.8	0.03	0.79
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	192.3	0.03	0.82
Mobile Combustion: Aviation	CO_2	176.9	169.4	0.03	0.84
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	123.8	0.02	0.86
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	117.1	0.02	0.88
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	79.0	0.01	0.90
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	76.2	0.01	0.91
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	73.5	0.01	0.92
Mobile Combustion: Road & Other	N_2O	48.5	50.9	0.01	0.93
Mobile Combustion: Marine	CO_2	48.0	45.6	0.01	0.94
CH_4 Emissions from Manure Management	CH_4	31.0	32.9	0.01	0.94
CO_2 Emissions from Cement Production	CO_2	33.3	32.5	0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	30.8	0.01	0.95
Fugitive Emissions from Oil Operations	CH_4	28.9	29.1	<0.01	0.96
SF_6 Emissions from Electrical Equipment	SF_6	29.2	27.8	<0.01	0.96
CH_4 Emissions from Wastewater Handling	CH_4	24.1	24.5	<0.01	0.97
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	19.2	<0.01	0.97
N_2O Emissions from Nitric Acid Production	N_2O	17.8	17.8	<0.01	0.97
N_2O Emissions from Manure Management	N_2O	16.2	16.7	<0.01	0.98
PFC Emissions from Aluminum Production	PFCs	18.1	15.6	<0.01	0.98
N_2O Emissions from Adipic Acid Production	N_2O	15.2	14.8	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	13.1	<0.01	0.98
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	12.6	<0.01	0.98
CO_2 Emissions from Waste Incineration	CO_2	10.9	12.0	<0.01	0.99
CO_2 Emissions from Lime Production	CO_2	11.2	11.0	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	8.4	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	7.0	<0.01	0.99
CO_2 Emissions from Aluminum Production	CO_2	6.3	6.4	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	5.9	<0.01	0.99
SF_6 Emissions from Magnesium Production	SF_6	5.4	5.1	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	5.0	<0.01	0.99
Mobile Combustion: Road & Other	CH_4	4.7	4.7	<0.01	1.00
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.2	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.0	<0.01	1.00
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	3.4	<0.01	1.00
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	2.9	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	1.8	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.6	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.4	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	1.3	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.2	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.2	<0.01	1.00
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	0.9	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.6	<0.01	1.00
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	0.6	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.4	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.4	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.4	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.3	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.1	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	6,086.3	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-5: 1992 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate ($Tg\ CO_2$ Eq.)	Current Year Estimate ($Tg\ CO_2$ Eq.)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	1,696.6	0.27	0.27
Mobile Combustion: Road & Other	CO_2	1,233.4	1,240.2	0.20	0.47
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,040.7	0.17	0.64
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	683.5	0.11	0.75
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	212.6	0.03	0.79
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	199.3	0.03	0.82
Mobile Combustion: Aviation	CO_2	176.9	167.1	0.03	0.84
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	124.0	0.02	0.86
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	119.4	0.02	0.88
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	77.1	0.01	0.90
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	75.0	0.01	0.91
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	74.2	0.01	0.92
Mobile Combustion: Marine	CO_2	48.0	55.7	0.01	0.93
Mobile Combustion: Road & Other	N_2O	48.5	54.2	0.01	0.94
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	34.9	0.01	0.94
CO_2 Emissions from Cement Production	CO_2	33.3	32.8	0.01	0.95
CH_4 Emissions from Manure Management	CH_4	31.0	31.9	0.01	0.95
Fugitive Emissions from Oil Operations	CH_4	28.9	28.0	<0.01	0.96
SF_6 Emissions from Electrical Equipment	SF_6	29.2	25.2	<0.01	0.96
CH_4 Emissions from Wastewater Handling	CH_4	24.1	25.1	<0.01	0.97
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	20.0	<0.01	0.97
N_2O Emissions from Nitric Acid Production	N_2O	17.8	18.3	<0.01	0.97
N_2O Emissions from Manure Management	N_2O	16.2	16.5	<0.01	0.98
PFC Emissions from Aluminum Production	PFCs	18.1	14.4	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	13.3	<0.01	0.98
N_2O Emissions from Adipic Acid Production	N_2O	15.2	13.1	<0.01	0.98
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	12.8	<0.01	0.98
CO_2 Emissions from Waste Incineration	CO_2	10.9	12.7	<0.01	0.99
CO_2 Emissions from Lime Production	CO_2	11.2	11.4	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	8.7	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	7.9	<0.01	0.99
CO_2 Emissions from Aluminum Production	CO_2	6.3	6.3	<0.01	0.99
SF_6 Emissions from Magnesium Production	SF_6	5.4	5.4	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	5.3	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	4.9	<0.01	0.99
Mobile Combustion: Road & Other	CH_4	4.7	4.7	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.1	<0.01	1.00
N_2O Emissions from N_2O Product Usage	N_2O	4.3	3.9	<0.01	1.00
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	3.8	<0.01	1.00
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	2.9	<0.01	1.00
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	1.9	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	1.8	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.6	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	1.5	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.5	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.3	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.2	<0.01	1.00
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	0.8	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.8	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.5	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.4	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.4	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.4	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.1	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	6,202.2	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-6: 1993 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate ($Tg CO_2 Eq.$)	Current Year Estimate ($Tg CO_2 Eq.$)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	1,766.7	0.28	0.28
Mobile Combustion: Road & Other	CO_2	1,233.4	1,277.1	0.20	0.48
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,065.9	0.17	0.65
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	672.0	0.11	0.76
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	214.6	0.03	0.79
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	192.5	0.03	0.82
Mobile Combustion: Aviation	CO_2	176.9	168.1	0.03	0.85
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	127.4	0.02	0.87
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	118.8	0.02	0.89
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	76.2	0.01	0.90
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	69.9	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	65.2	0.01	0.92
Mobile Combustion: Road & Other	N_2O	48.5	56.6	0.01	0.93
Mobile Combustion: Marine	CO_2	48.0	48.1	0.01	0.94
CO_2 Emissions from Cement Production	CO_2	33.3	34.6	0.01	0.94
CH_4 Emissions from Manure Management	CH_4	31.0	32.7	0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	31.8	0.01	0.95
SF_6 Emissions from Electrical Equipment	SF_6	29.2	29.5	<0.01	0.96
Fugitive Emissions from Oil Operations	CH_4	28.9	26.9	<0.01	0.96
CH_4 Emissions from Wastewater Handling	CH_4	24.1	25.5	<0.01	0.97
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	20.4	<0.01	0.97
N_2O Emissions from Nitric Acid Production	N_2O	17.8	18.6	<0.01	0.97
N_2O Emissions from Manure Management	N_2O	16.2	16.9	<0.01	0.98
N_2O Emissions from Adipic Acid Production	N_2O	15.2	14.0	<0.01	0.98
PFC Emissions from Aluminum Production	PFCs	18.1	13.7	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	13.5	<0.01	0.98
CO_2 Emissions from Waste Incineration	CO_2	10.9	13.5	<0.01	0.98
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	13.0	<0.01	0.99
CO_2 Emissions from Lime Production	CO_2	11.2	11.6	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	8.2	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	7.0	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	6.8	<0.01	0.99
CO_2 Emissions from Aluminum Production	CO_2	6.3	5.8	<0.01	0.99
SF_6 Emissions from Magnesium Production	SF_6	5.4	5.5	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	4.9	<0.01	0.99
Mobile Combustion: Road & Other	CH_4	4.7	4.7	<0.01	0.99
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	4.6	<0.01	1.00
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.5	<0.01	1.00
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	4.3	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.0	<0.01	1.00
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	3.6	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	1.7	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.6	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	1.6	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.4	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.3	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.3	<0.01	1.00
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	0.8	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.6	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.4	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.4	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.4	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.3	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.1	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	6,311.5	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-7: 1994 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate ($Tg CO_2 Eq.$)	Current Year Estimate ($Tg CO_2 Eq.$)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	1,776.6	0.28	0.28
Mobile Combustion: Road & Other	CO_2	1,233.4	1,311.4	0.20	0.48
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,085.2	0.17	0.65
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	678.7	0.11	0.75
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	214.8	0.03	0.79
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	212.1	0.03	0.82
Mobile Combustion: Aviation	CO_2	176.9	175.9	0.03	0.85
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	128.0	0.02	0.87
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	120.4	0.02	0.89
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	78.6	0.01	0.90
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	73.6	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	65.1	0.01	0.92
Mobile Combustion: Road & Other	N_2O	48.5	58.2	0.01	0.93
Mobile Combustion: Marine	CO_2	48.0	48.4	0.01	0.94
CO_2 Emissions from Cement Production	CO_2	33.3	36.1	0.01	0.94
CH_4 Emissions from Manure Management	CH_4	31.0	35.2	0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	31.6	<0.01	0.95
SF_6 Emissions from Electrical Equipment	SF_6	29.2	26.8	<0.01	0.96
CH_4 Emissions from Wastewater Handling	CH_4	24.1	26.1	<0.01	0.96
Fugitive Emissions from Oil Operations	CH_4	28.9	26.0	<0.01	0.97
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	21.1	<0.01	0.97
N_2O Emissions from Nitric Acid Production	N_2O	17.8	19.6	<0.01	0.97
N_2O Emissions from Manure Management	N_2O	16.2	16.9	<0.01	0.97
N_2O Emissions from Adipic Acid Production	N_2O	15.2	15.0	<0.01	0.98
CO_2 Emissions from Waste Incineration	CO_2	10.9	14.2	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	14.0	<0.01	0.98
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	13.2	<0.01	0.98
CO_2 Emissions from Lime Production	CO_2	11.2	12.1	<0.01	0.99
PFC Emissions from Aluminum Production	PFCs	18.1	12.0	<0.01	0.99
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	9.6	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	8.2	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	8.2	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	6.9	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	5.5	<0.01	0.99
SF_6 Emissions from Magnesium Production	SF_6	5.4	5.4	<0.01	0.99
CO_2 Emissions from Aluminum Production	CO_2	6.3	5.1	<0.01	0.99
Mobile Combustion: Road & Other	CH_4	4.7	4.7	<0.01	1.00
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	4.5	<0.01	1.00
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.5	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.0	<0.01	1.00
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	4.0	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	1.8	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.7	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	1.7	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.5	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.5	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.3	<0.01	1.00
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	0.9	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.8	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.5	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.4	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.4	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.3	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.1	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	6,430.6	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-8: 1995 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate ($Tg CO_2 Eq.$)	Current Year Estimate ($Tg CO_2 Eq.$)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	1,793.8	0.28	0.28
Mobile Combustion: Road & Other	CO_2	1,233.4	1,339.6	0.21	0.48
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,134.7	0.17	0.66
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	629.1	0.10	0.76
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	213.5	0.03	0.79
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	201.9	0.03	0.82
Mobile Combustion: Aviation	CO_2	176.9	171.4	0.03	0.85
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	127.2	0.02	0.87
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	123.0	0.02	0.88
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	77.6	0.01	0.90
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	74.4	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	68.5	0.01	0.92
Mobile Combustion: Road & Other	N_2O	48.5	58.8	0.01	0.93
Mobile Combustion: Marine	CO_2	48.0	51.2	0.01	0.94
CO_2 Emissions from Cement Production	CO_2	33.3	36.8	0.01	0.94
CH_4 Emissions from Manure Management	CH_4	31.0	36.0	0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	27.0	<0.01	0.95
CH_4 Emissions from Wastewater Handling	CH_4	24.1	26.7	<0.01	0.95
Fugitive Emissions from Oil Operations	CH_4	28.9	25.7	<0.01	0.96
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	24.3	<0.01	0.96
SF_6 Emissions from Electrical Equipment	SF_6	29.2	21.7	<0.01	0.97
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	20.5	<0.01	0.97
N_2O Emissions from Nitric Acid Production	N_2O	17.8	19.9	<0.01	0.97
N_2O Emissions from Adipic Acid Production	N_2O	15.2	17.2	<0.01	0.97
N_2O Emissions from Manure Management	N_2O	16.2	17.1	<0.01	0.98
CO_2 Emissions from Waste Incineration	CO_2	10.9	15.7	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	14.0	<0.01	0.98
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	13.3	<0.01	0.98
CO_2 Emissions from Lime Production	CO_2	11.2	12.8	<0.01	0.99
PFC Emissions from Aluminum Production	PFCs	18.1	11.8	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	9.0	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	8.6	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	7.6	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	7.4	<0.01	0.99
SF_6 Emissions from Magnesium Production	SF_6	5.4	5.6	<0.01	0.99
CO_2 Emissions from Aluminum Production	CO_2	6.3	5.3	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	5.1	<0.01	1.00
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	5.0	<0.01	1.00
Mobile Combustion: Road & Other	CH_4	4.7	4.6	<0.01	1.00
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.5	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.3	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	1.9	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	1.7	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.7	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.5	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.5	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.3	<0.01	1.00
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	0.8	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.7	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.4	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.4	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.4	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.4	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.1	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	6,484.7	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-9: 1996 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate ($Tg CO_2$ Eq.)	Current Year Estimate ($Tg CO_2$ Eq.)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	1,880.7	0.28	0.28
Mobile Combustion: Road & Other	CO_2	1,233.4	1,376.9	0.21	0.49
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,155.1	0.17	0.66
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	669.2	0.10	0.76
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	209.1	0.03	0.79
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	208.8	0.03	0.82
Mobile Combustion: Aviation	CO_2	176.9	180.2	0.03	0.85
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	127.4	0.02	0.87
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	120.5	0.02	0.89
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	79.0	0.01	0.90
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	68.3	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	63.2	0.01	0.92
Mobile Combustion: Road & Other	N_2O	48.5	58.5	0.01	0.93
Mobile Combustion: Marine	CO_2	48.0	47.8	0.01	0.93
CO_2 Emissions from Cement Production	CO_2	33.3	37.1	0.01	0.94
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	35.0	0.01	0.94
CH_4 Emissions from Manure Management	CH_4	31.0	34.6	0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	31.1	<0.01	0.95
CH_4 Emissions from Wastewater Handling	CH_4	24.1	26.9	<0.01	0.96
Fugitive Emissions from Oil Operations	CH_4	28.9	25.6	<0.01	0.96
SF_6 Emissions from Electrical Equipment	SF_6	29.2	24.3	<0.01	0.97
N_2O Emissions from Nitric Acid Production	N_2O	17.8	20.7	<0.01	0.97
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	20.3	<0.01	0.97
CO_2 Emissions from Waste Incineration	CO_2	10.9	17.2	<0.01	0.97
N_2O Emissions from Adipic Acid Production	N_2O	15.2	17.0	<0.01	0.98
N_2O Emissions from Manure Management	N_2O	16.2	17.0	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	14.2	<0.01	0.98
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	13.9	<0.01	0.98
CO_2 Emissions from Lime Production	CO_2	11.2	13.5	<0.01	0.99
PFC Emissions from Aluminum Production	PFCs	18.1	12.5	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	8.8	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	8.5	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	7.8	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	7.0	<0.01	0.99
SF_6 Emissions from Magnesium Production	SF_6	5.4	6.5	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	6.0	<0.01	0.99
CO_2 Emissions from Aluminum Production	CO_2	6.3	5.6	<0.01	1.00
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	5.5	<0.01	1.00
Mobile Combustion: Road & Other	CH_4	4.7	4.5	<0.01	1.00
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.5	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.2	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	2.0	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.8	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	1.7	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.6	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.6	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.3	<0.01	1.00
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	0.8	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.8	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.4	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.4	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.4	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.4	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.1	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	6,687.3	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-10: 1997 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate ($Tg CO_2$ Eq.)	Current Year Estimate ($Tg CO_2$ Eq.)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	1,927.8	0.28	0.28
Mobile Combustion: Road & Other	CO_2	1,233.4	1,402.5	0.21	0.49
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,159.5	0.17	0.66
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	681.5	0.10	0.76
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	214.5	0.03	0.80
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	203.4	0.03	0.83
Mobile Combustion: Aviation	CO_2	176.9	178.9	0.03	0.85
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	126.1	0.02	0.87
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	118.3	0.02	0.89
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	78.7	0.01	0.90
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	71.9	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	62.6	0.01	0.92
Mobile Combustion: Road & Other	N_2O	48.5	58.3	0.01	0.93
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	46.4	0.01	0.94
CO_2 Emissions from Cement Production	CO_2	33.3	38.3	0.01	0.94
CH_4 Emissions from Manure Management	CH_4	31.0	36.3	0.01	0.95
Mobile Combustion: Marine	CO_2	48.0	33.4	<0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	30.0	<0.01	0.96
CH_4 Emissions from Wastewater Handling	CH_4	24.1	27.4	<0.01	0.96
Fugitive Emissions from Oil Operations	CH_4	28.9	25.5	<0.01	0.96
SF_6 Emissions from Electrical Equipment	SF_6	29.2	21.7	<0.01	0.97
N_2O Emissions from Nitric Acid Production	N_2O	17.8	21.2	<0.01	0.97
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	20.7	<0.01	0.97
CO_2 Emissions from Waste Incineration	CO_2	10.9	17.8	<0.01	0.98
N_2O Emissions from Manure Management	N_2O	16.2	17.3	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	14.4	<0.01	0.98
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	14.0	<0.01	0.98
CO_2 Emissions from Lime Production	CO_2	11.2	13.7	<0.01	0.98
PFC Emissions from Aluminum Production	PFCs	18.1	11.0	<0.01	0.99
N_2O Emissions from Adipic Acid Production	N_2O	15.2	10.3	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	7.9	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	7.8	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	7.5	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	7.2	<0.01	0.99
SF_6 Emissions from Magnesium Production	SF_6	5.4	6.3	<0.01	0.99
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	6.3	<0.01	0.99
CO_2 Emissions from Aluminum Production	CO_2	6.3	5.6	<0.01	1.00
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	5.6	<0.01	1.00
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.8	<0.01	1.00
Mobile Combustion: Road & Other	CH_4	4.7	4.5	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.4	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	2.0	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	1.8	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.7	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.6	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.5	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.3	<0.01	1.00
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	0.8	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.8	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.4	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.4	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.4	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.3	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.2	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	6,764.4	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-11: 1998 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate ($Tg\ CO_2$ Eq.)	Current Year Estimate ($Tg\ CO_2$ Eq.)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	1,945.0	0.29	0.29
Mobile Combustion: Road & Other	CO_2	1,233.4	1,437.0	0.21	0.50
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,142.2	0.17	0.67
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	679.9	0.10	0.77
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	215.6	0.03	0.80
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	196.6	0.03	0.83
Mobile Combustion: Aviation	CO_2	176.9	180.8	0.03	0.85
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	124.5	0.02	0.87
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	116.7	0.02	0.89
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	78.6	0.01	0.90
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	67.4	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	62.8	0.01	0.92
Mobile Combustion: Road & Other	N_2O	48.5	57.6	0.01	0.93
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	56.5	0.01	0.94
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	40.2	0.01	0.94
CO_2 Emissions from Cement Production	CO_2	33.3	39.2	0.01	0.95
CH_4 Emissions from Manure Management	CH_4	31.0	38.8	0.01	0.95
CH_4 Emissions from Wastewater Handling	CH_4	24.1	27.7	<0.01	0.96
Mobile Combustion: Marine	CO_2	48.0	27.1	<0.01	0.96
Fugitive Emissions from Oil Operations	CH_4	28.9	25.0	<0.01	0.97
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	21.9	<0.01	0.97
N_2O Emissions from Nitric Acid Production	N_2O	17.8	20.9	<0.01	0.97
N_2O Emissions from Manure Management	N_2O	16.2	17.3	<0.01	0.97
CO_2 Emissions from Waste Incineration	CO_2	10.9	17.1	<0.01	0.98
SF_6 Emissions from Electrical Equipment	SF_6	29.2	17.1	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	14.7	<0.01	0.98
CO_2 Emissions from Lime Production	CO_2	11.2	13.9	<0.01	0.98
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	13.8	<0.01	0.99
PFC Emissions from Aluminum Production	PFCs	18.1	9.0	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	7.9	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	7.4	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	7.2	<0.01	0.99
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	7.1	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	6.6	<0.01	0.99
N_2O Emissions from Adipic Acid Production	N_2O	15.2	6.0	<0.01	0.99
CO_2 Emissions from Aluminum Production	CO_2	6.3	5.8	<0.01	0.99
SF_6 Emissions from Magnesium Production	SF_6	5.4	5.8	<0.01	1.00
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	4.8	<0.01	1.00
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.8	<0.01	1.00
Mobile Combustion: Road & Other	CH_4	4.7	4.4	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.3	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	2.0	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	1.8	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.8	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.7	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.6	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.2	<0.01	1.00
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	0.9	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.8	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.5	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.4	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.3	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.2	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.1	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.0	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	6,790.5	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-12: 1999 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate ($Tg CO_2$ Eq.)	Current Year Estimate ($Tg CO_2$ Eq.)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	1,946.6	0.28	0.28
Mobile Combustion: Road & Other	CO_2	1,233.4	1,478.1	0.22	0.50
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,147.9	0.17	0.67
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	691.1	0.10	0.77
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	213.5	0.03	0.80
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	197.8	0.03	0.83
Mobile Combustion: Aviation	CO_2	176.9	186.7	0.03	0.86
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	120.9	0.02	0.87
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	116.6	0.02	0.89
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	78.6	0.01	0.90
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	65.8	0.01	0.91
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	64.4	0.01	0.92
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	58.9	0.01	0.93
Mobile Combustion: Road & Other	N_2O	48.5	56.5	0.01	0.94
CO_2 Emissions from Cement Production	CO_2	33.3	40.0	0.01	0.94
CH_4 Emissions from Manure Management	CH_4	31.0	38.6	0.01	0.95
Mobile Combustion: Marine	CO_2	48.0	38.1	0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	30.4	<0.01	0.96
CH_4 Emissions from Wastewater Handling	CH_4	24.1	28.2	<0.01	0.96
Fugitive Emissions from Oil Operations	CH_4	28.9	23.7	<0.01	0.97
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	20.6	<0.01	0.97
N_2O Emissions from Nitric Acid Production	N_2O	17.8	20.1	<0.01	0.97
CO_2 Emissions from Waste Incineration	CO_2	10.9	17.6	<0.01	0.97
N_2O Emissions from Manure Management	N_2O	16.2	17.4	<0.01	0.98
SF_6 Emissions from Electrical Equipment	SF_6	29.2	16.4	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	15.2	<0.01	0.98
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	13.9	<0.01	0.98
CO_2 Emissions from Lime Production	CO_2	11.2	13.5	<0.01	0.99
PFC Emissions from Aluminum Production	PFCs	18.1	8.9	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	8.3	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	8.1	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	7.5	<0.01	0.99
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	7.2	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	6.9	<0.01	0.99
SF_6 Emissions from Magnesium Production	SF_6	5.4	6.0	<0.01	0.99
CO_2 Emissions from Aluminum Production	CO_2	6.3	5.9	<0.01	0.99
N_2O Emissions from Adipic Acid Production	N_2O	15.2	5.5	<0.01	1.00
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.8	<0.01	1.00
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	4.4	<0.01	1.00
Mobile Combustion: Road & Other	CH_4	4.7	4.2	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.2	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	2.0	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	1.9	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.8	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.7	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.5	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.2	<0.01	1.00
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	0.9	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.8	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.4	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.4	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.3	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.3	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.2	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	6,852.5	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-13: 2000 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate (Tg CO_2 Eq.)	Current Year Estimate (Tg CO_2 Eq.)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	2,034.9	0.29	0.29
Mobile Combustion: Road & Other	CO_2	1,233.4	1,497.3	0.21	0.50
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,199.9	0.17	0.67
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	688.8	0.10	0.77
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	212.6	0.03	0.80
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	199.3	0.03	0.83
Mobile Combustion: Aviation	CO_2	176.9	193.2	0.03	0.86
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	125.7	0.02	0.87
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	115.7	0.02	0.89
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	77.2	0.01	0.90
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	75.1	0.01	0.91
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	65.7	0.01	0.92
Mobile Combustion: Marine	CO_2	48.0	59.1	0.01	0.93
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	56.2	0.01	0.94
Mobile Combustion: Road & Other	N_2O	48.5	55.0	0.01	0.95
CO_2 Emissions from Cement Production	CO_2	33.3	41.2	0.01	0.95
CH_4 Emissions from Manure Management	CH_4	31.0	38.0	0.01	0.96
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	29.8	<0.01	0.96
CH_4 Emissions from Wastewater Handling	CH_4	24.1	28.4	<0.01	0.97
Fugitive Emissions from Oil Operations	CH_4	28.9	23.5	<0.01	0.97
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	19.6	<0.01	0.97
N_2O Emissions from Nitric Acid Production	N_2O	17.8	19.6	<0.01	0.97
CO_2 Emissions from Waste Incineration	CO_2	10.9	18.0	<0.01	0.98
N_2O Emissions from Manure Management	N_2O	16.2	17.7	<0.01	0.98
SF_6 Emissions from Electrical Equipment	SF_6	29.2	15.9	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	15.3	<0.01	0.98
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	14.4	<0.01	0.99
CO_2 Emissions from Lime Production	CO_2	11.2	13.3	<0.01	0.99
PFC Emissions from Aluminum Production	PFCs	18.1	8.9	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	7.7	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	7.5	<0.01	0.99
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	6.3	<0.01	0.99
N_2O Emissions from Adipic Acid Production	N_2O	15.2	6.0	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	6.0	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	5.8	<0.01	0.99
CO_2 Emissions from Aluminum Production	CO_2	6.3	5.7	<0.01	1.00
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.8	<0.01	1.00
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	4.4	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.2	<0.01	1.00
Mobile Combustion: Road & Other	CH_4	4.7	4.2	<0.01	1.00
SF_6 Emissions from Magnesium Production	SF_6	5.4	3.2	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	1.9	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.9	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	1.7	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.7	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.4	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.2	<0.01	1.00
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	1.0	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.8	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.5	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.5	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.4	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.4	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.2	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	7,038.3	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-14: 2001 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate ($Tg CO_2 Eq.$)	Current Year Estimate ($Tg CO_2 Eq.$)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	1,968.7	0.29	0.29
Mobile Combustion: Road & Other	CO_2	1,233.4	1,510.0	0.22	0.51
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,149.0	0.17	0.67
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	710.1	0.10	0.78
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	212.8	0.03	0.81
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	193.2	0.03	0.83
Mobile Combustion: Aviation	CO_2	176.9	183.4	0.03	0.86
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	124.9	0.02	0.88
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	114.3	0.02	0.90
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	83.4	0.01	0.91
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	75.8	0.01	0.92
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	59.1	0.01	0.93
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	55.6	0.01	0.94
Mobile Combustion: Road & Other	N_2O	48.5	52.9	0.01	0.94
CO_2 Emissions from Cement Production	CO_2	33.3	41.4	0.01	0.95
CH_4 Emissions from Manure Management	CH_4	31.0	38.8	0.01	0.95
Mobile Combustion: Marine	CO_2	48.0	37.2	0.01	0.96
CH_4 Emissions from Wastewater Handling	CH_4	24.1	28.1	<0.01	0.96
Fugitive Emissions from Oil Operations	CH_4	28.9	23.5	<0.01	0.97
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	19.8	<0.01	0.97
CO_2 Emissions from Waste Incineration	CO_2	10.9	18.8	<0.01	0.97
N_2O Emissions from Manure Management	N_2O	16.2	18.0	<0.01	0.98
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	16.2	<0.01	0.98
N_2O Emissions from Nitric Acid Production	N_2O	17.8	15.9	<0.01	0.98
SF_6 Emissions from Electrical Equipment	SF_6	29.2	15.6	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	15.4	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	13.9	<0.01	0.99
CO_2 Emissions from Lime Production	CO_2	11.2	12.8	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	7.6	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	7.2	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	5.7	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	5.4	<0.01	0.99
N_2O Emissions from Adipic Acid Production	N_2O	15.2	4.9	<0.01	0.99
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.8	<0.01	0.99
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	4.5	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	4.2	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.1	<0.01	1.00
CO_2 Emissions from Aluminum Production	CO_2	6.3	4.1	<0.01	1.00
Mobile Combustion: Road & Other	CH_4	4.7	4.1	<0.01	1.00
PFC Emissions from Aluminum Production	PFCs	18.1	4.0	<0.01	1.00
SF_6 Emissions from Magnesium Production	SF_6	5.4	2.5	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	1.9	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.8	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.4	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	1.3	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.3	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.1	<0.01	1.00
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	0.8	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.8	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.5	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.4	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.4	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.3	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.1	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	6,883.9	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-15: 2002 Key Source Tier 1 Analysis - Level Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate (Tg CO_2 Eq.)	Current Year Estimate (Tg CO_2 Eq.)	Level Assessment	Cumulative Total
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	2,005.6	0.29	0.29
Mobile Combustion: Road & Other	CO_2	1,233.4	1,534.4	0.22	0.51
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,160.6	0.17	0.68
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	680.1	0.10	0.78
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	209.9	0.03	0.81
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	193.0	0.03	0.83
Mobile Combustion: Aviation	CO_2	176.9	177.6	0.03	0.86
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	121.8	0.02	0.88
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	114.4	0.02	0.89
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	91.7	0.01	0.91
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	77.4	0.01	0.92
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	54.4	0.01	0.93
Mobile Combustion: Marine	CO_2	48.0	52.4	0.01	0.93
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	52.2	0.01	0.94
Mobile Combustion: Road & Other	N_2O	48.5	50.7	0.01	0.95
CO_2 Emissions from Cement Production	CO_2	33.3	42.9	0.01	0.95
CH_4 Emissions from Manure Management	CH_4	31.0	39.5	0.01	0.96
CH_4 Emissions from Wastewater Handling	CH_4	24.1	28.7	<0.01	0.96
Fugitive Emissions from Oil Operations	CH_4	28.9	23.2	<0.01	0.97
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	19.8	<0.01	0.97
CO_2 Emissions from Waste Incineration	CO_2	10.9	18.8	<0.01	0.97
N_2O Emissions from Manure Management	N_2O	16.2	17.8	<0.01	0.98
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	17.7	<0.01	0.98
N_2O Emissions from Nitric Acid Production	N_2O	17.8	16.7	<0.01	0.98
N_2O Emissions from Wastewater Handling	N_2O	12.8	15.6	<0.01	0.98
SF_6 Emissions from Electrical Equipment	SF_6	29.2	14.8	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	N2O	12.6	14.0	<0.01	0.99
CO_2 Emissions from Lime Production	CO_2	11.2	12.3	<0.01	0.99
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	6.9	<0.01	0.99
CH_4 Emissions from Rice Production	CH_4	7.1	6.8	<0.01	0.99
N_2O Emissions from Adipic Acid Production	N_2O	15.2	5.9	<0.01	0.99
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	5.8	<0.01	0.99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	5.3	<0.01	0.99
PFC Emissions from Aluminum Production	PFCs	18.1	5.2	<0.01	0.99
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.8	<0.01	0.99
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	4.4	<0.01	1.00
CO_2 Emissions from Aluminum Production	CO_2	6.3	4.2	<0.01	1.00
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.1	<0.01	1.00
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	4.1	<0.01	1.00
Mobile Combustion: Road & Other	CH_4	4.7	4.0	<0.01	1.00
SF_6 Emissions from Magnesium Production	SF_6	5.4	2.4	<0.01	1.00
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	2.0	<0.01	1.00
Mobile Combustion: Aviation	N_2O	1.7	1.7	<0.01	1.00
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.5	<0.01	1.00
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.3	<0.01	1.00
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	1.3	<0.01	1.00
CO_2 Emissions from Ferroalloys	CO_2	2.0	1.2	<0.01	1.00
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.0	<0.01	1.00
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.7	<0.01	1.00
Mobile Combustion: Marine	N_2O	0.4	0.4	<0.01	1.00
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.4	<0.01	1.00
N_2O Emissions from Waste Incineration	N_2O	0.4	0.4	<0.01	1.00
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.3	<0.01	1.00
Mobile Combustion: Aviation	CH_4	0.2	0.1	<0.01	1.00
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	1.00
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	1.00
TOTAL		6,129.1	6,934.6	1.00	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Table 1-16: 1990-2002 Key Source Tier 1 Analysis - Trend Assessment

IPCC Source Categories	Direct Greenhouse Gas	Base Year Estimate ($Tg CO_2 Eq.$)	Current Year Estimate ($Tg CO_2 Eq.$)	Trend Assessment	Percent Contribution to Trend	Cumulative Total
Mobile Combustion: Road & Other	CO_2	1,233.4	1,534.4	0.02	17	17
CO_2 Emissions from Stationary Combustion - Oil	CO_2	695.7	680.1	0.01	13	30
CO_2 Emissions from Stationary Combustion - Coal	CO_2	1,681.4	2,005.6	0.01	13	43
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	91.7	0.01	11	54
CO_2 Emissions from Stationary Combustion - Gas	CO_2	978.9	1,160.6	0.01	7	61
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	210.0	193.0	0.01	5	66
CO_2 Emissions from Iron and Steel Production	CO_2	85.4	54.4	0.01	5	71
Fugitive Emissions from Coal Mining and Handling	CH_4	81.9	52.2	0.01	5	76
Mobile Combustion: Aviation	CO_2	176.9	177.6	<0.01	3	79
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	35.0	19.8	<0.01	2	81
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	117.9	114.4	<0.01	2	84
SF_6 Emissions from Electrical Equipment	SF_6	29.2	14.8	<0.01	2	86
Fugitive Emissions from Natural Gas Operations	CH_4	122.0	121.8	<0.01	2	88
PFC Emissions from Aluminum Production	PFCs	18.1	5.2	<0.01	2	90
N_2O Emissions from Adipic Acid Production	N_2O	15.2	5.9	<0.01	1	91
Fugitive Emissions from Oil Operations	CH_4	28.9	23.2	<0.01	1	92
CO_2 Emissions from Waste Incineration	CO_2	10.9	18.8	<0.01	1	93
Direct N_2O Emissions from Agricultural Soils	N_2O	190.5	209.9	<0.01	1	94
CO_2 Emissions from Cement Production	CO_2	33.3	42.9	<0.01	1	95
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	72.3	77.4	<0.01	1	95
CH_4 Emissions from Manure Management	CH_4	31.0	39.5	<0.01	1	96
CO_2 Emissions from Ammonia Production and Urea Application	CO_2	19.3	17.7	<0.01	1	96
Mobile Combustion: Road & Other	N_2O	48.5	50.7	<0.01	1	97
SF_6 Emissions from Magnesium Production	SF_6	5.4	2.4	<0.01	0	97
N_2O Emissions from Nitric Acid Production	N_2O	17.8	16.7	<0.01	0	97
CO_2 Emissions from Aluminum Production	CO_2	6.3	4.2	<0.01	0	98
Non-CO_2 Emissions from Stationary Combustion	CH_4	8.2	6.9	<0.01	0	98
Mobile Combustion: Marine	CO_2	48.0	52.4	<0.01	0	98
CH_4 Emissions from Wastewater Handling	CH_4	24.1	28.7	<0.01	0	99
Mobile Combustion: Road & Other	CH_4	4.7	4.0	<0.01	0	99
CO_2 Emissions from Natural Gas Flaring	CO_2	5.8	5.3	<0.01	0	99
CH_4 Emissions from Rice Production	CH_4	7.1	6.8	<0.01	0	99
N_2O Emissions from Wastewater Handling	N_2O	12.8	15.6	<0.01	0	99
PFC, HFC, and SF_6 Emissions from Semiconductor Manufacture	SF_6	2.9	4.4	<0.01	0	99
CO_2 Emissions from Ferroalloys	CO_2	2.0	1.2	<0.01	0	99
CO_2 Emissions from Soda Ash Manufacture and Consumption	CO_2	4.1	4.1	<0.01	0	99
CO_2 Emissions from Titanium Dioxide Production	CO_2	1.3	2.0	<0.01	0	100
CH_4 Emissions from Iron and Steel Production	CH_4	1.3	1.0	<0.01	0	100
N_2O Emissions from Manure Management	N_2O	16.2	17.8	<0.01	0	100
CO_2 Emissions from Limestone and Dolomite Use	CO_2	5.5	5.8	<0.01	0	100
CO_2 Emissions from Lime Production	CO_2	11.2	12.3	<0.01	0	100
CO_2 Emissions from Phosphoric Acid Production	CO_2	1.5	1.3	<0.01	0	100
Non-CO_2 Emissions from Stationary Combustion	N_2O	12.6	14.0	<0.01	0	100
Fugitive Emissions from Abandoned Coal Mines	CH_4	3.4	4.1	<0.01	0	100
CO_2 Emissions from CO_2 Consumption	CO_2	0.9	1.3	<0.01	0	100
Mobile Combustion: Aviation	N_2O	1.7	1.7	<0.01	0	100
CH_4 Emissions from Petrochemical Production	CH_4	1.2	1.5	<0.01	0	100
N_2O Emissions from Waste Incineration	N_2O	0.4	0.4	<0.01	0	100
CO_2 Emissions from Stationary Combustion - Geothermal Energy	CO_2	0.4	0.3	<0.01	0	100
N_2O Emissions from N_2O Product Usage	N_2O	4.3	4.8	<0.01	0	100
CH_4 Emissions from Agricultural Residue Burning	CH_4	0.7	0.7	<0.01	0	100
Mobile Combustion: Aviation	CH_4	0.2	0.1	<0.01	0	100
CH_4 Emissions from Silicon Carbide Production	CH_4	0.0	0.0	<0.01	0	100
Mobile Combustion: Marine	N_2O	0.4	0.4	<0.01	0	100
N_2O Emissions from Agricultural Residue Burning	N_2O	0.4	0.4	<0.01	0	100
Mobile Combustion: Marine	CH_4	0.1	0.1	<0.01	0	100
TOTAL		6,129.1	6,934.6	0.10		

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

References

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